

POPULAR Computing WEEKLY

27 May 1982 Vol 1 No 5

30p

Computer concerto

Reviews: Mission
of the Deep

Vic-20
printer

Inside
the Spectrum

Function keys on Vic-20



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that would be the case for the 100 days. They did make slightly positive contribution at around 100 days to 1000 days. Beyond that time, there's no significant difference and probably for all four they're going to converge. The average growth rate is 10% per year. It's about 10% per year and up to 1000 or the maximum time in the scenario or the baseline, we see an average of 10%. You can see, therefore, how encouraging this spending

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— 1 —

There is another way you might think about it. In the existing Medicare system, a provider's fees would now need to reflect the increased administrative overhead associated with the fact that each plan would have to hire its own auditors. In other words, as you move away from a single plan, there would be more administrative overhead. This would increase the cost of care, and therefore, the cost of insurance premiums.

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theatre, and the other, the *Shakespeare*, were built in 1872. The former is now the home of the Royal Shakespeare Company, and the latter of the Royal Opera House. The two theatres are connected by a bridge over the River Avon.

Page 10

10 of 10

He was a man of great energy and determination, and he left a lasting legacy in the field of education.

10 of 10

• A **reduction** (decrease) in the amount of energy available to the starting members of the food chain is called **primary production**.

- a. primary P factors
- b. secondary P factors
- c. tertiary P factors
- d. quaternary P factors

A primary production factor influences the amount of energy available to the primary producers.

— 10 —

Franklin, a member of the "Free Soil" party, was born in 1808 at Utica, New York. He studied law at Utica, and was admitted to the bar in 1831. Franklin was a member of the New York State Assembly from 1837 to 1841, and of the U.S. House of Representatives from 1843 to 1847. He was a member of the New York State Senate from 1849 to 1851, and of the U.S. Senate from 1851 to 1857. Franklin was a member of the Free Soil party, and was elected to the U.S. Senate by the Free Soil party. He was a member of the Free Soil party, and was elected to the U.S. Senate by the Free Soil party.

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or Congress**



Journal of Health Politics, Policy and Law

THE HISTORICAL
SOCIETY,
BOSTON,
MASSACHUSETTS,
1881-1882.



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As noted previously, all species have the same general requirements, which point to the importance of maintaining a balance between water and precipitation levels. In order to predict the future hydrological patterns in the different parts of the basin, it is necessary to analyze and understand the current hydrological situation [Fig. 6]. The observed mean rainfall was found

ANSWER

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POPULAR Computing WEEKLY

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How to submit articles

Articles which are submitted for publication should not be more than 1000 words long.
All submissions should be typed and submitted double spaced on A4 stationery paper.

Programmes should be written in BASIC.
Programmes should be submitted on 3½" floppy disks.

All correspondence concerning the magazine should be sent to the editor, or to the editorial office, no sooner than 4 weeks.

Answers

Popular Computing Weekly cannot accept any responsibility for long delays in programme and puzzle answers, although we will strive by all means to make sure programmes work.

This Week



See feature by Alan North

News
Apple's resurrected at last! 20/20
INTERVIEW

Class Reports 7
Barton College reports on the
Amateur Computer Club.

Computer contests 8
Nick Hampshire runs the
Micros in a puzzle

Reviews 10
Mission of the Disc, ZX Keyboards

Open Forum 11
The design of programs

Programs 12
BBC BASIC Today's news
the ZX Spectrum

Commodore 13
How to use the VIC 20 keyboard keys

Second & edition 21
About computers on and around

Reader & results 22
ADVICE PROGRAMS AND TELEVISION

Postal & postie 23
Your questions answered

Competitions 24
Puzzles, competitions

Editorial

Why are so many of the games submitted to this magazine so banal? Why?

In the past couple of weeks there has been a great upsurge of programs with titles such as *Police Chase* or *Island Invasion*.

It is understandable that the themes of so many programs should reflect national events.

These are still every days in home computing and most of us are still finding our way around our machines.

So we choose themes which are easy to handle.

But we must look to the future.

Orchids will become more computer friendly as we will be able to exert a greater imagination in our programs.

It will not be enough to be good at moving graphics codes around the screen in fast moving patterns, patterns.

Programmers will have to know how to motivate the user, will have to understand how to play on the user's emotions, how to capture the user's imagination and hold their.

Blood-thirsty programs are an easy way out. Together we can raise the standard.

Next Week



Can you survive
the Black Hole? The
stressed player seems to think he's
over hooked. His turn you to be there.

News

NewBrain debuts at less than £200

Commodore Business Systems have launched the NewBrain, at a base model price of £199. With an 80x80x80 colour display, the system is fully expandable to over 2 megabytes.

The NewBrain is based on an original design, taken in the Newcomer Enterprise Board by Clive Ranson. Newcomer Laboratories has given the task of developing, and manufacturing, the first 100 units. Last year the project was sold to Commodity Business Systems, which has completed its development.

There are five models of the NewBrain available, basic of which features a full size keyboard.

The base Model A is built around the Zilog 8000 microprocessor with 128 KRAM and 256 ROM onboard. It has dual cassette port, 16 and monitor ports, an expansion

port and VDU bidirectional and parallel ports.

Model AD is the same as Model A but includes an onboard floppy disk drive. Standard RAM is 128K, 1M expandable to over 2 megabytes.

They are currently expansion modules are available for both models, costing £100. 256K, 512K or 1MB of RAM, a maximum of four 1.44M modules may be connected, giving a total memory of over 2 megabytes.

Programmable graphics cards can be used, based via memory or, under CP/M®, via disk.

An important feature of the NewBrain is its use, programmeing using BASIC, C, C++, C, Pascal and assembly language. Even with a 6809, 68000, 68020 processor and 68040. Happy also, the unit will only require 12V up to 1A.

Andy Barnes, Commodity's



NewBrain's compact design

Marketing Director, says:

"The NewBrain is a professional personal computer which, with a full support keyboard, bidirectional bus ports, numeric and conventional keypads, as well as the better ports."

The NewBrain is scheduled for high-volume production, available in July. Model A is £199, Model AD is £229. The 256K and 512K RAM modules are £75 and £85, respectively.

Address: Information from Commodity Business Systems Ltd, 15000 Brookside Road, Titchfield, Middlesex TW11 8TP.

The Bee-Box gives Vic extra bytes

The Vic-20 expansion unit, manufactured by BBC Computer Systems of Britain, is now available.

John Blackford, managing director of BBC Computer Systems explained that the unit is a spin-off from BBC's Vicente development.

The Bee-Box, as it is called, provides the Vic with extra memory and allows a colour-based Terminal, VisiCalc and Frontend, all in 25 pages.

Inside the Bee-Box there are two ports... a BBC BASIC display and a BBC VDU display colour-based based colour terminal that follows the Bee-Box with the VIC-20.

The BBC computer uses 128K RAM RAM with a 128K EPROM operating system space and 64 machine-codeable alphanumeric RAM.

The lightweight nature of the Bee-Box allows it to be moved and it fitted with a stick to replace the Vic expansion socket which has been used in various ways.

The unit adds the 128K plus VDU and has a reader writer interface, from Beebug, Frontend, BBC-20, VIC-20.

Buzz words from Beebug

Beebug, the independent National User Group for the BBC-20, has published its first monthly newsletter.

Issue One contains 26 pages, densely packed with information of interest to both the beginner and the more advanced user. There is also a review of the BBC machine, outlining specific facilities, advantages and disadvantages.

A package containing, for example, BBC BASIC, multi-parallel printer interface, colour vision interface, graphics and high-resolution colour, remote file processing, disk controller and processing applications, is available for £20.

The interface is designed to be used with Capital Computer's Expansion Membrane in BBC-expansion-board, with a standard BBC connector for RAM/ROM addressing.

The interface, designed by Mr D. Kinsella, allows the BBC to drive most types of printer, thus providing greater compatibility than that offered by Sinclair's own printer.

At £20.00, including VAT, the module has both BBC-20 and Commodore interfaces. There is 16K on-board memory and three positions in a 2.5M EPROM. The BBC BASIC program runs and is used with the EPROM program.

Contact Capital Computer Ltd, 100 Chelmsford Street, London EC2N 4JL.

Soft-sell on Prestel

Microtelco is being to promote software on to Prestel, following its success in the British Telecom COIN Prestel telephone system.

Software manufacturers can sell their programs through Prestel by contacting British Telecom on Prestelphone 2021.

Suppliers contributing the software to Microtelco Ltd, 100 Chelmsford Street, London EC2N 4JL, are: Apple, PET, Sharp, Tandy and Video Games makers amongst an ever-increasing list of BBC software houses for the BBC-20 series.

Further information from Marketing Department, Bureau of Information Services, Computer House, High Street, Chelmsford CM1 1QH, Essex.



The BBC interface with Epson... thanks to Capital

Capital gives ZX81 a choice of printers

Capital Computer has presented a semi-parallel interface for the ZX81, as reported last week.

The interface, designed by Mr D. Kinsella, allows the ZX81 to drive most types of printer, thus providing greater compatibility than that offered by Sinclair's own printer.

At £20.00, including VAT, the module has both BBC-20 and Commodore interfaces. There is 16K on-board memory and three positions in a 2.5M EPROM. The BBC BASIC program runs and is used with the EPROM program.

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Club Reports

Is your club involved in any special projects? Use this page to tell the world about it.

Helping people to get more from machines

Vernon Gifford describes how the Amateur Computer Club adds more user

Most hobby users will have seen across the Amateur Computer Club (ACC) at shows where members demonstrate club stands. Usually there are about 20 Clubs and User Groups (see Computer Today) represented at shows with up to 40 machines of many different types in action.

This has become the ideal place to meet other enthusiasts for a wider exchange of views than is possible within individual groups. Prospective buyers find it particularly useful to be able to discuss the merits of computer equipment and software with impartial users who have no commercial bias.

Hundreds of enquiries via ACC's own electronic bulletin board in touch with their nearest local Club or affiliated group through the ACC Database — which covers about 250 organisations, and which will shortly be available nationwide on Prestel. These displays are organised by the very active David Arnell, who is also secretary of ACC.

The Club was founded in 1979 by Mike Ladd, as a newsletter group. Later, with the help of Bob Skinner, the group became a club, organising meets and meetings. This led to the formation of other clubs around the country and as these developed, the ACC found itself with a new co-ordinating role to provide background services to the personal computer movement.

This, the oldest computer club in the world, began at a time when there were few users.

It was only in 1981 that the first computer magazine appeared and, so far this year, the ACC held a unique position.

As the emphasis has switched from hardware and home-based computers to off-the-shelf mass systems and software, the ACC has had to become more concerned with computer pro-

grams. Members now require more information for their applications whether in homes, business, education or small businesses. Today the main function of a co-ordinating body like the ACC is to link the users to the information.

This has been achieved via The ACCulator, edited by Deryck and Diana Hodder. We made great strides and now David Butcher has strengthened the team.

Vernon Gifford takes care of contact with national educational bodies, the BBC, TV and radio, and the computer media.

As the ACC becomes recognised in this new role, it is more likely to be consulted as the representative body of the large personal computer population.

Club and User Group liaison is another important part of the ACC's programme. This enables groups to share their experiences and leads to national or regional activities in specific areas where individual clubs cannot raise sufficient numbers to justify getting speakers.

A feedback process

To encourage feedback, the ACC offers to supply the representative of the newsletter at the base cost of £2.80 to any club appointing a corresponding representative. Many clubs have already taken up the offer.

Various types of associate or group membership are under consideration, and some degree of regional development seems to be desirable. The first experiment — the Association of London Computer Clubs (ALCC) — which is run by Paul Foster Pelt, under the leadership of Peter Bladfield (who has joined the ACC Committee) has been extremely successful.

As these new activities expanded direct matches to clubs have complemented news in the ACCulator.

The ACC supports new groups that

Note to Club Reporters: Please send copy to Secretary, Hutchinson Court, 18 Wilton Road, London SW1V 7HF, with details of successes you have had with your club, with ideas for helping, tales song and with any news of special meetings. We look forward to hearing from you.



Communicating ... Vernon Gifford

ing their formation, and, if necessary, until such time as they are self-sufficient.

National conferences or workshops are another interesting feature. Last November about 35 clubs attended a "Micro-Robotics" conference at Imperial College, displaying everything from Micro-Mouse to hydraulic mobile robots. A special User Group has been formed.

A second successful conference on "The Home and Your Computer", (Printed and refereed) was organised last Easter by the ACC Chairman, Peter White. This also promises to spawn a similar User Group.

Other ACC activities include a technical enquiry service and hardware, software and literature library.

Individual membership costs £4.80 for one year, including the six copies of the Newsletter. Facilities are available to negotiate a group membership for a whole club — which has already been taken up by the North London Hobby Computer Club. Their members all receive a copy of ACCULATOR — to which the Club adds its own interests. This reduces the workload of club officers, and saves duplication of effort.

For further information, contact Roger Beale (Management and technical enquiries) 32 John's College, Oxford, OX1 3JF; or Vernon Gifford (Liaison and Clubs), 111 Belgrave Road, London, SW1V 7HF. Tel. 01-832 3287.

COVER STORY

Computer

Enter the world of sound technology with this simple program which allows you to compose music on a piano-like keyboard



With Computer Concerto you can compose your own music. Using the sound generating facility of the BBC Micro the program plays notes at the touch of a key.

It displays a representation of a section of the piano keyboard on the TV screen and produces one-and-a-half octaves of notes, including the sharps and flats.

When a selected key is depressed the sound is produced and the particular note chosen is indicated on the display by all relevant dots. Below the relevant piano key.

To get the note C, press the C key and so on. The control key gives the sharps and flats and the shift key gives the upper octave.

So, for example, when pressing F, the shift and control keys together make F# in the upper octave.

The program

The program itself is quite simple and is most easily understood if it is considered in five parts.

1 Lines 100 to 108 give the keyboard display showing the tones and semi-tones COMPASSION?

2 Lines 200 to 245 are the data for producing the notes. It gives the frequency data, it gives the key data

and it indicates the shift and control key data.

3 Lines 300 to 350 look at the keyboard and compare the notes which have been entered with the data in Lines 200 to 245.

4 Lines 400 and 409 look at the character keys and the shift and control keys on the keyboard.

5 Lines 370 and 380 search through the data for the matching values.

When the correct data is located the program jumps out of the search loop to Line 400. Lines 400 to 405 then produce the desired note, M, selected from the data arrays, originally layed-in at 401 and 405.

The BBC Micro has three audio oscillators on board and the program makes a combination of two or them, 300014 and 300015, in Lines 400 and 401.

In Line 410 the amplitude control, 300016, is picked and the loop in Line 413 then produces a decaying amplitude. The combination of locations 300014, 300015 and 300016 produces a wave tone with some persistence, simulating the sound of a piano.

Lines 400 to 405 display an asterisk on the screen below the pitch played, so that you can take at least as far as you like.

This program is just a start to making music on the BBC Micro. It would be quite easy to adapt Computer Concerto in order to vary the lengths of the notes played and to share and re-use them, making it possible to compose tunes and play them back. Such an adaptation would be well worth a try.

Whether you are a budding Bach or the next Mozart, there should be no stopping you!

Specially written for
Popular Computing Weekly

By

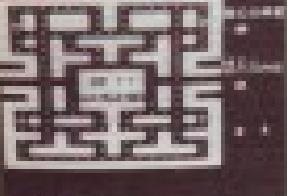
Nick Hampshire

Concerto



Reviews

software



Packman

Available from Any-Commodore Dealer.
Price \$15.00.

One of last year's successes in the arcade game world was *Pac-Man*, a game in which you had to control a little monster, eating small pieces of fruit while avoiding the ghosts who were chasing you. Now comes the same game, but with a twist and thus getting points as he moves around.

Likes were definitely complemented by ones of the few men running around after you three days ago, was the value lost, with a bonus like it seems, paid in the starting.

Other responses included that "what would appear from time to time, was additional points" were to be had by eating these delicacies.

There hasn't already been spoken about in the reviews of the game. During those changes the man chasing you, has four sets of numbers, and you could then add them as another method of receiving points.

The reason for mentioning all of this is quite simple. The success of any reproduction of an arcade game for a small price depends on how faithful that reproduction is.

Packman, by its Tuchs, seems identical, and the game jumps into the standard VICE. The rules are not explained anywhere, presumably there assumes that you know the game from your local pub.

All they do tell you is how to control your monster, which proves to be somewhat difficult, as the four keys causing you to move up, down, left, and right are all next to each other, and it's very easy to get into quite a tangle.

The reason on which the game is based does not use the whole VICE screen, although the program does use the top portion, instead of filling the entire of your screen, due to graphics and sound is not very good, and the game as a whole is quite slow to respond. In short - don't waste.

Summary

Some of the features of the original arcade game are missing so all in all it's not one of the best games currently available.

Cassette A/B

Called: Jn St James' Street,
Cheltenham, Glos.
Price £12.00

So you like the sitting informative title of this cassette? I do. It has a unique feature, concerning the two programs each from Cassette A, and B (16K each). Now you know, those two that Cassette A/B cassette £12.00 16K Programs for £12.00 and savings of £1.00 off their products.

The authors of the Cassette A/B program, which is remarkable originally in going with 16 instructions or pure plain looks of the programs are saved, but they still work and are very good implementations of standard ideas.

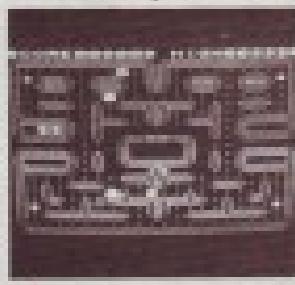
comes the show in "Learn to Paint" with no graphics. Well, at least you can't see them, because without graphics and no warning of it. The trick here is that the user enters the words to paint and is printed out where they should be — so the computer knows what they just did you do.

Then comes "Towers of Babel" with three or more versions of a Maze and Tower Puzzles, another Jackpot and another "Joyce" (2 x 3), and an impressive one "Find Machine".

This is all very pedestrian, then — but I guess someone has to make the 16K versions of the standard games. Cassette's are fairly cheap, fast without problems, and come with good documentation.

Summary

A low-value compilation of nice BASIC versions of standard games.



Viscones

Available from Any-Commodore Dealer.
Price £12.00.

Woman, by Big Right, is a nightmare improvement from available on cassette for the standard VICE, it uses the whole of the 16K space for the game, and although

all of the features in the game are basic enough, it is very well written and is quick to respond to your requests.

This cassette may well should have been a very good program. As in the Hi-Tech game, the keys for moving your man are now in each other, making the program to say the least. However, the background music (there is no difference in noise when different sounds take place until the gather is enough to send you looking for the nearest off volume left, depending on not the sound).

Summary

If you've got nimble fingers, and a volume control on your set, you're in for an enjoyable time with this particular cassette.

Mission Of The Deep

Address: 28 Speke Close, Kibworth, Leicestershire LE12 8LH
Price £12.00

This is one of those paid "boxed" graphics adventure games — I have no other name for the game. As with all adventures you don't know where you are, what you're doing, or how to do it.

In this case the mouse is hidden until the end and the focus is on the game not at you with the warning and the choice of escape, the objectives for exploration, the employment and other persons of interest.

The program starts rather strangely with LOADING — PRESS ANY KEY TO CONTINUE (you're not sure what happens if it doesn't load). After that you're straight into deep black water on your own.

The accompanying notes do provide some sort of guidance to the third levels of play. I'm not sure that many real addicts would say that these notes are diagnostic, but in reality they give just about everything they'd need to reach completeness — most probably.

It's not for me to tell you how to get to the bottom — of this program I mean. So that doesn't leave much for me to tell you.

Personally I prefer Mission's adventure graphics games, some of which are superb. At the same time this is as good an example of "good" graphics adventure as any I've seen, and while the graphics don't come up to Alan's standards, they'll do.

Mission Of The Deep is a little program taking up some 10K of RAM, it loads easily and is appealing to both of all ages.

Summary

An excellent 16K example of the best graphics adventure game on computer game. No problem. If you're into such things.

Reviews

hardware

Vic 1515 Printer

Reviewed by John Compton (shorter)

Price £129

Many Commodore users may feel the price of the printer is too high for the Vic 1515 and other independently produced printers—but the price of the Vic 1515 is a mystery best left to the marketplace. However, we're stuck with it, so what do you get for your £129 when you buy the Vic 1515?

The printer connects via to the same port as the VIC, and thus, as with the VIC itself, can be easily interfaced to other Commodore machines.

This is not quite as good as it might seem, as the printer has a switch on the front panel, say to change the character number to be either A or B. Consequently two different printers have two different character numbers and be used for varying formats.

The switch also allows you to run the printer through a self-diagnostic test, which prints out all the possible characters generated from the VIC interface.

It is a 20 character per second unidirectional printer, using a five-level dot matrix. Capable of printing out all the VIC graphics, you can print out most individual dot-addressable graphics, although this does tend to eat up the print-head memory rapidly.

Maximum paper size is 16 columns, but unfortunately it takes non-standard paper sizes, like A4, which is quite difficult to get hold of—assuming it is possible for a machine aimed at the domestic market.

The quality of the output when in upper case mode is quite good, but unfortunately lower case produces fairly odd results.

The printer is, for instance, there are several dots every ninth character in both upper and lower case, thus making readability considerably worse. As the main function of a printer is to reproduce other people's otherwise useless CP/M files, this is something that Commodore ought to be looking at.

There is a routine in the manual to dump the contents of the screen on to the printer in vice versa.

There are 120-column modes available on the printer, and two alternative paperfeeds for selecting whether you want to be in portrait or landscape (up-side down) mode. These enable you to print in both wider and longer cases than the same line.

The control codes give you access to such features as reverse video characters, inverse video, user definable characters and so on.

With a print speed of only 20 characters

per second, taking just a long program can become particularly tedious. It is also an unnecessary money processor. If you are going to long, say to the VIC interface, make your own a lot of effort and let the printer get on with it.

Summary

It is an expensive, noisy, slow printer but with fairly clear output. It does have some interesting features like the character test and diagnostic, however, as it's just about the only printer on the market at the moment you haven't got a lot to choose!

getter to make it easier to load the computer?

This is a fairly easy to construct as all keys are in one big block and there is no way you can get stuck in to it in the naming day round. The Z8001, when mounted inside the case, provides the ideal page density as the pic is firmly held in the case.

£24

Fun with Microcomputers

By Compton (shorter)

Howard Books, 198 pages paperback

£12.95

This is the sort of book that must have appealed to the Commodore owner — as anyone armed with "Cartes" (parts of an instruction set) and a sensible brain, The Price of Power, may be either self-taught (I paid £12.95 in America, where it comes from, which specifies that much less is available imported across the channel).

What that reader purchased was perhaps the package in the bottom of his/her own bureau, because microprocessors are likely to be less interesting.

The author's cover claim, "Programmable for kids and adults — no experience required." The person, reader and programs in this book introduce you to programming with BASIC quickly.

There are ten ways to learn programming, with understanding and without it. Both may be useful or bizarre, but if doing it yourself, this book, at a reasonable price of one pound for each Computer and BASIC (pounds £24.95), does not go far enough for understanding, nor is using it a hazard of fun.

Section starts off with a few chapters of theory. His language is concise but not straightforward. His facts are not all beyond dispute. For example, a microcomputer is an extremely small electronic component built as a monolithic or a single integrated circuit on an insulating substrate. These components act as on/off switches. Then there is an application to BASIC programming — 18 eighteen pages, not bad, but, as I say, not explained clearly with understanding.

The rest of the content is simple and programmingless. There are 50 of these, a few being novel. Few listings take up more than about 4 pages, they are in half-precision binary-coded decimal and tend to be mathematical-based.

I wouldn't recommend anyone to buy this book. All the same you may get some programs there from it — unless your basic knowledge is not very strong.

Summary

This little book does not help by basic programs. It is rather superficial and out-dated but contains a few useful things. £12.95

 commodore

COMPUTING

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It is important that your programs are bug-free before you send them in. We cannot test all of them. Contributions should be sent to: Popular Computing Weekly, Whitelock Court, 19 Whitelock Street, London WC1H 7AW.

Print using routines

by G. J. COOPER

The Z800 BASIC lacks a PRINT USING instruction. The PRINT USING instruction is particularly useful for tabulating a list of related alphanumeric data, when the numbers have to have the decimal points lined up in columns. It is also useful to be able to specify the number of decimal places to be printed, regardless of the size of the number.

The listing given in figure 1 contains a PRINT USING routine in lines 7600 to 8579.

Lines 380 to 470 explain how to use the routine, and lines 10000 to 14000 contain a demonstration program to show the routine in use. Figure 2 shows the output from a run of this program — the code is quite arbitrary.

In order to use the PRINT USING routine, you must first specify the format required.

This is done by setting up Z8 to the desired format. Z8 represents a line across the printer and thus should not normally be more than 80 characters in length. '0' is used to indicate where literal strings are to be printed and '-' is used to indicate where numbers are required.

The position of the decimal point (.) and is indicated by a '-'. The number of places of decimals to be printed is controlled by the number of '-' after the '-'. For example, values from -8.99 to 99.99 are allowed by '-'.

Outside this range (in the range specified by the number of '-' in Z8) zero's will result.

Any characters in Z8 other than 0 or '-' will be printed as they stand in the positions occupied in Z8.

Remember, you must assign the data to be printed to the using #8. Each item of data must match that expected in Z8 and should be separated by a comma (,). Numbers or numerical variables should be assigned using the S/1/P function and all data should

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Each month the editor goes through all the programs that you send to Open Forum in order to find the Program of the Month.

The author of that program will qualify for £1000 if this award fee is not paid for published programs that come in by 15/10.

That is at the end of the month the four best programs of the month go forward to an exciting Program of the Month contest, for which there is a £1000 prize.

This month the best prize is a super Z8 printer, worth £3000.

And at the end of the year, all the best Programs of the Month will be entered in the super annual competition, Program of the Year. No need in your program today!

Programs which are most likely to be considered for the Blue Plate will be computer printed and accompanied by a cassette.

The programs will be well documented, the documentation being typed with a double spacing between each line. The documentation should start with a general description of the program and then give some detail of how the program has been programmed and of its special features.

Length restrictions in Z8. Please specify to 100 characters per line and about seven to eight spaces.

Please enclose a self addressed envelope.

be linked together using the "-+-". Y8 must end with a comma.

For an example, see lines 1348 and 1042 and 1248-1000 in figure 1.

Lastly, to print a line of data, call the routine at line 7000, i.e. 00000008 7000.

The program routine uses the following variables:

#8D — factor to generate the required number of decimal places.

DECPL — points to the decimal point in Z8.

DP — points to the decimal point in Z8.

PLACES — number of decimal places to be printed.

Z8 — a string to hold number to be printed.

PI — a string to hold data.

TF — a string specifying the format, 'I' for literal.

'0' for numbers.

'.' for decimal point.

anything else is printed unchanged.

Lines 7030-7070 scan Z8, character by character for '0' or '-'.

Line 7040 denotes the start of a string. Brackets are left justified. The routine at line 5000 to 6070 is called to print the string, padding out or truncating as necessary to the exact number of 8 or 16.

Line 7090 detects where the start of a number is to be printed. The routine at lines 8000-8150 is called to print the number. If the width of the field Z8 is insufficient, zeros '0' will result.

Line 7090 will print the character in Z8 if it is neither a '0' nor a '-'.

Line 7090 will cause the next cell in the routine to start a fresh line.

String handling routine

Lines 8000 sets 'Y' to point to the first character of Y8.

Lines 8040-8050 print a character and increments 'Y' to point to the next character.

Lines 8050-8060 check whether another character is to be printed ('0' in Z8). If the end of Z8 is reached, or if there is no '0', printing will stop and control will pass to the #100 to truncate the string.

Line 8060 checks whether the string in Y8 is shorter than the space allowed, and if so jumps to line 8170 to 'pad' out the field with spaces.

Transcile
Lines 8100-8150 scan for the end of the string in Y8 (indicated by the 0). Then they truncate the string.

Open Forum

Since 1979, students from 170 other types of schools, not those from regular schools, have been placed at PHS.

100

Using 4000 elements from V7 the same analysis, as that the next type of data, is at the user of V8.

Linné *SCHEHATA* put out the field with species until 15 were out of 15 or the end of 15, as indicated.

[View full product details](#)

Line 10230 uses '7' to point to the first character of 200.

Line 6810 sets `TR` to a `NULL` string.
Line 68110 checks whether the first
character is a `''` (or value less than

Lines 8888-8889 assign 88 to the number up to the decimal point. Line 88888 saves the position of the

Lines 10-11 assign the numbers

Like 11128 describes boys 10-12 the older boys, you find the need seems to be concentrated in the upper part of YH.

Lines 9-10-11 find the position of the *thinner* part in B).

Lens 500-18 showing adoption of the 50 mm
lens throughout the printing.
Lenses 5000-21 and 5000-5000 had
the same series of standard changes.

Using these calculations, the multiplying factor F_{eff}

Line 8220 gives the number in the required position in digit fit decimal points and prints the required number.

Line 1000 sets it to point to the next character in D.

Chaplin

卷之三

How are these properties to allow these bidirectional graphs to operate. The key are update elements of the string. All positioned in the BDI to produce a balanced, updating pattern.

The second program, *oblique*, is based on the first one, but it uses a series of full slopes and splices, producing quite a different result.

The third program, "Personnel," based on a program by Lester Gouley, uses the same method as the first, but in an unexpected way to produce more balanced patterns. From time to

Digitized by srujanika@gmail.com

REFERENCES

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Open Forum

Graphics

By Tim Hartwell

```
10 REM ***** BASIC *****  
20 REM ***** CIRCLE *****  
30 REM ***** BY TIM HARTWELL *****  
40 REM *****  
50 REM *****  
60 REM *****  
70 REM *****  
80 REM *****  
90 REM *****  
100 REM *****  
110 REM *****  
120 REM *****  
130 REM *****  
140 REM *****  
150 REM *****  
160 REM *****  
170 REM *****  
180 REM *****  
190 REM *****  
200 REM *****  
210 REM *****  
220 REM *****  
230 REM *****  
240 REM *****  
250 REM *****  
260 REM *****  
270 REM *****  
280 REM *****  
290 REM *****  
300 REM *****  
310 REM *****  
320 REM *****  
330 REM *****  
340 REM *****  
350 REM *****  
360 REM *****  
370 REM *****  
380 REM *****  
390 REM *****  
400 REM *****  
410 REM *****  
420 REM *****  
430 REM *****  
440 REM *****  
450 REM *****  
460 REM *****  
470 REM *****  
480 REM *****  
490 REM *****  
500 REM *****  
510 REM *****  
520 REM *****  
530 REM *****  
540 REM *****  
550 REM *****  
560 REM *****  
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580 REM *****  
590 REM *****  
600 REM *****  
610 REM *****  
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660 REM *****  
670 REM *****  
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690 REM *****  
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730 REM *****  
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770 REM *****  
780 REM *****  
790 REM *****  
800 REM *****  
810 REM *****  
820 REM *****  
830 REM *****  
840 REM *****  
850 REM *****  
860 REM *****  
870 REM *****  
880 REM *****  
890 REM *****  
900 REM *****  
910 REM *****  
920 REM *****  
930 REM *****  
940 REM *****  
950 REM *****  
960 REM *****  
970 REM *****  
980 REM *****  
990 REM *****
```

```
1000 REM *****  
1010 REM *****  
1020 REM *****  
1030 REM *****  
1040 REM *****  
1050 REM *****  
1060 REM *****  
1070 REM *****  
1080 REM *****  
1090 REM *****  
1100 REM *****  
1110 REM *****  
1120 REM *****  
1130 REM *****  
1140 REM *****  
1150 REM *****  
1160 REM *****  
1170 REM *****  
1180 REM *****  
1190 REM *****  
1200 REM *****  
1210 REM *****  
1220 REM *****  
1230 REM *****  
1240 REM *****  
1250 REM *****  
1260 REM *****  
1270 REM *****  
1280 REM *****  
1290 REM *****  
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1480 REM *****  
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1500 REM *****  
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1530 REM *****  
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1560 REM *****  
1570 REM *****  
1580 REM *****  
1590 REM *****  
1600 REM *****  
1610 REM *****  
1620 REM *****  
1630 REM *****  
1640 REM *****  
1650 REM *****  
1660 REM *****  
1670 REM *****  
1680 REM *****  
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1700 REM *****  
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1870 REM *****  
1880 REM *****  
1890 REM *****  
1900 REM *****  
1910 REM *****  
1920 REM *****  
1930 REM *****  
1940 REM *****  
1950 REM *****  
1960 REM *****  
1970 REM *****  
1980 REM *****  
1990 REM *****  
2000 REM *****
```

then the program will clear the screen (line 240) to start all over again.

The fourth program, *ROBOL*, is based on a routine which originally plotted an oval in Mode 4. The program chooses the centre point of the oval, and its height and width randomly. Then plots the oval around this. Using a random step size (see line 129) based on the number produced in line 118.

Lines 78 and 80 determine whether or not the plotted shape will be moved slightly up, down, left or right before being re-plotted.

The seventh shape, which varies every time you run the program, resembles a tilted figure, which explains the title.

An average peek

by Tim

The ZX81 manual explains how to find total byte n at a given ROM address, and these values vary between 0 and 255. It is of interest to know what the average ROM byte value is, and what is the least numerical value of all the bytes up to a given address.

This can be rapidly calculated by the following program run in RAM. To speed the program 'leaving out' of the address n, the average peek value in the ROM is defined as:

```
TOTAL bytes  
average = TOTAL / bytes  
total address = 1
```

```
1 REM PEEK addressed from RAM  
2 REM *****  
3 REM *****  
4 REM *****  
5 REM *****  
6 REM *****  
7 REM *****  
8 REM *****  
9 REM *****  
10 REM *****  
11 REM *****  
12 REM *****  
13 REM *****  
14 REM *****  
15 REM *****  
16 REM *****  
17 REM *****  
18 REM *****  
19 REM *****  
20 REM *****  
21 REM *****  
22 REM *****  
23 REM *****  
24 REM *****  
25 REM *****  
26 REM *****  
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32 REM *****  
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34 REM *****  
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38 REM *****  
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40 REM *****  
41 REM *****  
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43 REM *****  
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81 REM *****  
82 REM *****  
83 REM *****  
84 REM *****  
85 REM *****  
86 REM *****  
87 REM *****  
88 REM *****  
89 REM *****  
90 REM *****  
91 REM *****  
92 REM *****  
93 REM *****  
94 REM *****  
95 REM *****  
96 REM *****  
97 REM *****  
98 REM *****  
99 REM *****
```

The results are displayed in four columns with the headings ADDRESS, TOTAL, TOTAL and MEAN. By varying the upper limit on line 30, as many results as required can be displayed and also the STEP length can be varied as required.

It was found that for address numbers up to 200 the average byte values varied between 119 and 125. The program file will invoke the ZX81, 1K RAM and the running time will depend on the upper limit in line 30 and the STEP value.

Open Forum

Space Fighters

100

As this program allows user-defined graphics, it will work well in the unexpanded file. The main aim of this game is to destroy as many enemy fighters as possible in 100 seconds.

The enemy ships appear from the center ship at the top of the screen. The player aligns the sights on an enemy target and fires.

The sights can be moved in all four directions and when you release the sight cursor it will continue to move until you release that key.

When the program is run, it first asks you whether you want to generate random numbers or calculate the mean.

While you are reading this introduction, the computer designs the instruction characters and copies them to the memory.

After the first class completed its program, the students were asked to evaluate their experience.

After this the computer generates its answer by Line 30. After this is finished the computer draws the alien, another alien and fighters and Lines 35 to 3900 make the fighters move down the screen and also draw the fighters.

Lines 4000 to 4030 carry out the string comparison and also tell if you have hit your target. If you do, your target function has the computer play a short tone and awards you 10 points (Lines 4040 to 4060).

If you only allow the user craft a greeting before the computer only makes an equivalent name and address you is gone.

If you wish to have a journal, then you must submit *Literary Review* to it.

Push settings

101

The object of the program is to make the user in "batch counting" combine groups of a picture without breaking them down into single items.

The program displays a random number of black squares in the top half of the screen in a random pattern. After a few moments these are removed and the user is invited to estimate how many squares were displayed.

After each attempt the computer gives the current number and after 10

— 1 —

Mr. J. R. Thompson

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ANSWER TO THE CHIEF QUESTIONS

Consequently, the first step in the analysis of the data was to determine the number of clusters in the data set.

www.ijerph.org | ISSN: 1660-4601 | DOI: 10.3390/ijerph16030800

1996-1997 學年上學期

1940-1941
1941-1942

（三）在於社會的發展上，

19. The following table shows the number of hours worked by each of the 1000 employees of a company.

明治三十一年正月廿二日
大正元年正月廿二日

Open Forum

1. *Leucanthemum vulgare* L.
2. *Leucanthemum vulgare* L.
3. *Leucanthemum vulgare* L.
4. *Leucanthemum vulgare* L.
5. *Leucanthemum vulgare* L.
6. *Leucanthemum vulgare* L.
7. *Leucanthemum vulgare* L.
8. *Leucanthemum vulgare* L.
9. *Leucanthemum vulgare* L.
10. *Leucanthemum vulgare* L.

Flash memory

100% Recyclable

attempt to banish nothing in their

The main benefit of the program is not in its categoricity but in the opportunity that it gives, if one wishes at least, help you change the way you count and become more open to the possibilities of numbers that turn out to have a high degree of accuracy.

Programmers should be looking for a score of somewhere around the 80 per cent mark, but be more pleased when an average of 90 per cent is achievable.

Page 10

Line 204. This value is used later to determine the frequency with which squares are painted. A higher value will result, on average, in more squares and vice-versa.

June 2004, The Sun and the Times
published stories against the spending bill
and its many opponents.

Line 389. There is nothing particularly significant about the maximum value of the loop, simply that if the full 280 pixel positions are used it is about the maximum display resolution before the measure is lost.

line 208. On a 162 2001 it is always important to remember that point statements can be associated logically on the same program line. Here, the conditions associated with each point statement ensure that either a space is printed or a black square.

Line 200. It is the number in a previous year.

Line 402. It is the total number in all groups.

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Pie Chart

By Simon Lane

It is often useful to draw a pie chart to show how some total quantity is divided up into different categories. This program does just that. It asks for the total quantity, then for the names and percentages of each category. It then draws the pie chart.

The first part of the program is as follows:

```
1000 PRINT "ENTER TOTAL QUANTITY"
1010 INPUT A
1020 PRINT "ENTER NAME OF CATEGORIES"
1030 INPUT C$ 
1040 PRINT "ENTER PERCENTAGE"
1050 INPUT P%
1060 PRINT "ENTER NAME OF CATEGORIES"
1070 INPUT C$ 
1080 PRINT "ENTER PERCENTAGE"
1090 INPUT P%
1100 PRINT "ENTER NAME OF CATEGORIES"
1110 INPUT C$ 
1120 PRINT "ENTER PERCENTAGE"
1130 INPUT P%
1140 PRINT "ENTER NAME OF CATEGORIES"
1150 INPUT C$ 
1160 PRINT "ENTER PERCENTAGE"
1170 INPUT P%
1180 PRINT "ENTER NAME OF CATEGORIES"
1190 INPUT C$ 
1200 PRINT "ENTER PERCENTAGE"
1210 INPUT P%
```

Pie chart

by ELLI

This program will draw a pie chart from any data you care to give it. First ask for a title. This must be a maximum of 20 characters, and will appear above the pie chart in the final display.

Next ask for the number of categories which must be a maximum of seven. Then ask for the units. This is the name of whatever unit each category is measured in, for example people or days, and can have up to six characters.

Finally you are asked for the name and number in each category. The name may contain up to nine characters. The screen is then cleared and the pie chart is shown. Note that the figures in the % column will not always add up to 100, due to rounding.

Arithmeto

by ELLI

Two programs for the ZX81/80 for your children to practice their sums. The first program is for eight to 11 year-olds and will concentrate both addition or subtraction. The second program for younger children, is shown for addition only, but can be easily adapted for subtraction, multiplication or division.

Both programs will put them in 10, but only at the expense of the lack of constants in the listing, and a primitive display. With 100 available, much more can be done.

In the listing in Figure 1, the difficulty can be adjusted to match the child by altering the values in lines 60 and 70. The 10 gives one decimal place and the 1000 gives values up to 99.9. The routine at line 580 ensures that the decimal counts down. The answer is checked at line 240 and allows for the slight imprecision in the ZX81 holding decimal numbers when converted to binary code.

In the listing in Figure 2, the difficulty is dependent on the ranges in lines 60 and 61. Lines 60-1000 repeat four values, nearer to the right answer and ensure that no two values are alike. Lines 110-120 aspects one out of the four as the correct answer. The choice is selected randomly between a 1 and

Advertisement

by Ray Marshall

1000 PRINT "ENTER NAME"

1010 INPUT N\$

1020 PRINT "ENTER AGE"

1030 INPUT A

1040 PRINT "ENTER GENDER"

1050 INPUT G\$

1060 PRINT "ENTER ADDRESS"

1070 INPUT AD\$

1080 PRINT "ENTER TEL NO."

1090 INPUT TEL\$

1100 PRINT "ENTER GENDER"

1110 INPUT G\$

1120 PRINT "ENTER ADDRESS"

1130 INPUT AD\$

1140 PRINT "ENTER TEL NO."

1150 INPUT TEL\$

1160 PRINT "ENTER GENDER"

1170 INPUT G\$

1180 PRINT "ENTER ADDRESS"

1190 INPUT AD\$

1200 PRINT "ENTER TEL NO."

1210 INPUT TEL\$

1220 PRINT "ENTER GENDER"

1230 INPUT G\$

1240 PRINT "ENTER ADDRESS"

1250 INPUT AD\$

1260 PRINT "ENTER TEL NO."

1270 INPUT TEL\$

1280 PRINT "ENTER GENDER"

1290 INPUT G\$

1300 PRINT "ENTER ADDRESS"

1310 INPUT AD\$

1320 PRINT "ENTER TEL NO."

1330 INPUT TEL\$

1340 PRINT "ENTER GENDER"

1350 INPUT G\$

1360 PRINT "ENTER ADDRESS"

1370 INPUT AD\$

1380 PRINT "ENTER TEL NO."

1390 INPUT TEL\$

1400 PRINT "ENTER GENDER"

1410 INPUT G\$

1420 PRINT "ENTER ADDRESS"

1430 INPUT AD\$

1440 PRINT "ENTER TEL NO."

1450 INPUT TEL\$

1460 PRINT "ENTER GENDER"

1470 INPUT G\$

1480 PRINT "ENTER ADDRESS"

1490 INPUT AD\$

1500 PRINT "ENTER TEL NO."

1510 INPUT TEL\$

1520 PRINT "ENTER GENDER"

1530 INPUT G\$

1540 PRINT "ENTER ADDRESS"

1550 INPUT AD\$

1560 PRINT "ENTER TEL NO."

1570 INPUT TEL\$

1580 PRINT "ENTER GENDER"

1590 INPUT G\$

1600 PRINT "ENTER ADDRESS"

1610 INPUT AD\$

1620 PRINT "ENTER TEL NO."

1630 INPUT TEL\$

1640 PRINT "ENTER GENDER"

1650 INPUT G\$

1660 PRINT "ENTER ADDRESS"

1670 INPUT AD\$

1680 PRINT "ENTER TEL NO."

1690 INPUT TEL\$

1700 PRINT "ENTER GENDER"

1710 INPUT G\$

1720 PRINT "ENTER ADDRESS"

1730 INPUT AD\$

1740 PRINT "ENTER TEL NO."

1750 INPUT TEL\$

1760 PRINT "ENTER GENDER"

1770 INPUT G\$

1780 PRINT "ENTER ADDRESS"

1790 INPUT AD\$

1800 PRINT "ENTER TEL NO."

1810 INPUT TEL\$

1820 PRINT "ENTER GENDER"

1830 INPUT G\$

1840 PRINT "ENTER ADDRESS"

1850 INPUT AD\$

1860 PRINT "ENTER TEL NO."

1870 INPUT TEL\$

1880 PRINT "ENTER GENDER"

1890 INPUT G\$

1900 PRINT "ENTER ADDRESS"

1910 INPUT AD\$

1920 PRINT "ENTER TEL NO."

1930 INPUT TEL\$

1940 PRINT "ENTER GENDER"

1950 INPUT G\$

1960 PRINT "ENTER ADDRESS"

1970 INPUT AD\$

1980 PRINT "ENTER TEL NO."

1990 INPUT TEL\$

2000 PRINT "ENTER GENDER"

2010 INPUT G\$

2020 PRINT "ENTER ADDRESS"

2030 INPUT AD\$

2040 PRINT "ENTER TEL NO."

2050 INPUT TEL\$

2060 PRINT "ENTER GENDER"

2070 INPUT G\$

2080 PRINT "ENTER ADDRESS"

2090 INPUT AD\$

2100 PRINT "ENTER TEL NO."

2110 INPUT TEL\$

2120 PRINT "ENTER GENDER"

2130 INPUT G\$

2140 PRINT "ENTER ADDRESS"

2150 INPUT AD\$

2160 PRINT "ENTER TEL NO."

2170 INPUT TEL\$

2180 PRINT "ENTER GENDER"

2190 INPUT G\$

2200 PRINT "ENTER ADDRESS"

2210 INPUT AD\$

2220 PRINT "ENTER TEL NO."

2230 INPUT TEL\$

2240 PRINT "ENTER GENDER"

2250 INPUT G\$

2260 PRINT "ENTER ADDRESS"

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2280 PRINT "ENTER TEL NO."

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2520 PRINT "ENTER TEL NO."

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2860 PRINT "ENTER ADDRESS"

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2940 PRINT "ENTER TEL NO."

2950 INPUT TEL\$

2960 PRINT "ENTER GENDER"

2970 INPUT G\$

2980 PRINT "ENTER ADDRESS"

2990 INPUT AD\$

3000 PRINT "ENTER TEL NO."

3010 INPUT TEL\$

3020 PRINT "ENTER GENDER"

3030 INPUT G\$

3040 PRINT "ENTER ADDRESS"

3050 INPUT AD\$

3060 PRINT "ENTER TEL NO."

3070 INPUT TEL\$

3080 PRINT "ENTER GENDER"

3090 INPUT G\$

3100 PRINT "ENTER ADDRESS"

3110 INPUT AD\$

3120 PRINT "ENTER TEL NO."

3130 INPUT TEL\$

3140 PRINT "ENTER GENDER"

3150 INPUT G\$

3160 PRINT "ENTER ADDRESS"

3170 INPUT AD\$

3180 PRINT "ENTER TEL NO."

3190 INPUT TEL\$

3200 PRINT "ENTER GENDER"

3210 INPUT G\$

3220 PRINT "ENTER ADDRESS"

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3240 PRINT "ENTER TEL NO."

3250 INPUT TEL\$

3260 PRINT "ENTER GENDER"

3270 INPUT G\$

3280 PRINT "ENTER ADDRESS"

3290 INPUT AD\$

3300 PRINT "ENTER TEL NO."

3310 INPUT TEL\$

3320 PRINT "ENTER GENDER"

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3340 PRINT "ENTER ADDRESS"

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3360 PRINT "ENTER TEL NO."

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3500 PRINT "ENTER GENDER"

3510 INPUT G\$

3520 PRINT "ENTER ADDRESS"

3530 INPUT AD\$

3540 PRINT "ENTER TEL NO."

3550 INPUT TEL\$

3560 PRINT "ENTER GENDER"

3570 INPUT G\$

3580

Spectrum

In this new slot various contributors explore different aspects of the ZX Spectrum.

Take a look inside the ZX Spectrum

Stephen Adams By the lid off the machine everyone's talking about

The ZX Spectrum is basically a more advanced version of the ZX81 with more RAM memory within the computer and the ability to have colour plus a limited sound capability.

There are 14 ICs in the case plus the Sinclair 1619, a volt voltage regulator. The eight RAM ICs give a total of 16K using the same chips as used in the Sinclair 16K HAM pack which is not available on the Spectrum.

Also included is the transformer on the top right which provides -5V, +5V and -12V for the RAM chips and is still decoupling ready.

The two large chips on the right-hand side are the NMOS ROM and the Z80A micro-processor.

Moving to the left we come to ten MC14157 chips which are used when retrieving the RAM, the frequency to the left side of these is the Universal Logic Array (ULA) which consists of all the elements like which control colour display, memory decoding and rendering.

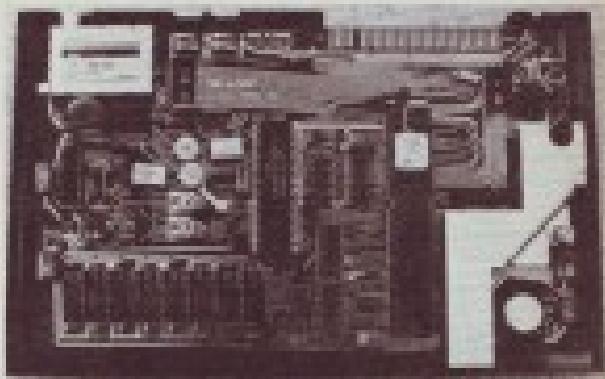
Above the RAM chips is the colour encoding circuitry and its crystal, plus the crystal for the micro-processor which runs at 1MHz. The ULA however divides this down to 0.5MHz before it goes to the Z80A.

These crystals both have variable trimmers which can be adjusted to keep the frequency correct and this makes the timing much accurate than the Z80, which used a ceramic filter to control the frequency.

On the far left-hand side below the video modulator (the meta board) is the PSU, ensuring ICs which allow you to put colours on the TV picture.

All the leads are three-wire, +5V, 5V power in, barrel socket, or the reverse model set half, unless the Jack Plug socket (shown in the picture, ROM and RAM) projects.

There is also the edge connector which now has 60 metal pins on both sides, unlike the ZX81 which only had



What you get when you take the cover off the new ZX Spectrum.

20. This means that only input/output ports "live" here on the Spectrum.

The memory map is similarly used up to the ROM and RAM and only the ROM CS line appears on the edge connector. This means that any memory mapped devices will have to be redesigned.

The edge connections are shown below and the ones that are different from the ZX81 are marked with an asterisk.

No of connector	Name of connector
1	ROM
2	RAM
3	*
4	*
5	*
6	*
7	*
8	*
9	*
10	*
11	*
12	*
13	*
14	*
15	*
16	*
17	*
18	*
19	*
20	*
21	*
22	*
23	*
24	*
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41	*
42	*
43	*
44	*
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46	*
47	*
48	*
49	*
50	*
51	*
52	*
53	*
54	*
55	*
56	*
57	*
58	*
59	*
60	*

The keyboard plugs into two sockets as before so that other keyboards fitted to the ZX81 would work. The only other sockets left on the board

are two empty IC sockets to allow the 32K internal RAM board to plug into the Spectrum.

The left-hand side socket contains the address bus and the right-hand one the data and control lines. The data board will connect to 16K Spectrum by a ROM and any extra RAM.

This enables the user to use interface or execute the IN and OUT commands as the colour mode was hacked after half an hour and so no program of any length could be put in. However, I have since found of several Spectrums performing quite happily for longer periods, so it would appear we had a bad machine.

The signs of overheating were not always fitting together on the screen, corruption of the program in RAM, plus the system going back to showing the copyright line previously appears as starting up the machine.

The IN and OUT commands are a very useful way of getting information via buses out to an external device, but although there are paid by Sinclair's manual to be paid, less than 250 are available to the programme-

Conclusion

The ZX Spectrum will prove an interesting challenge to the manufacturers who are at the moment supplying products for the ZX81.

For the user it means that again Sinclair has imposed a great deal of restrictions on what hardware can be used with the machine.

Programming

Keys which unlock the most potential

Nick Hampshire tells you how to get the most from Vic-20's function keys

On the right-hand side of the Vic-20 keyboard there are four special keys known as function keys. By using these keys in both shifted and unshifted mode they can be used to define up to eight different functions.

Unfortunately, Commodore has not provided any BASIC commands on the standard VIC-20 to use these keys, you must consequently develop your own routines.

In order to use the function keys one needs to understand the way in which the VIC system software detects a key depression. The VIC does this with a keyboard scanning routine which is called 60 times per second by an interrupt generated by one of the timer timers on the VIC chip.

The keyboard scanning routine is very simple and scans all the keys,



... to greater options

including the four function keys, looking for a key which has been pressed. The keyboard is organised as an 8x8 matrix with the keys at the intersection points of the vertical and horizontal lines.

The vertical lines are connected to an eight-line output port and the hor-

izontal lines to an eight-line input port. If a key is pressed then an output line is connected to an input line, with just one combination of input/output line for every key.

To release the keyboard the computer sets just one of the output lines of a timer port, while keeping the rest high, then reads the input port to see if any of the input lines are low. This is repeated eight times for each output line.

If one of the input lines is found to be low then a key depression is detected and the keyboard scanning software determines which key was pressed.

This key is first assigned a number which is stored in location 203 prior to being decoded by the input routine and given an ASCII code value.

When dealing with the function keys we are interested in the value stored in location 203; we are also interested in the status of the shiftkey, this is stored at location 382.

Learning the values

By looking at the contents of location 203 we find that the function keys have been assigned the following values. Remember that the value in 203 is for the shifted and unshifted key and is the same:

function key 41 & 42 — 39
function key 43 & 44 — 41
function key 45 & 46 — 95
function key 47 & 48 — 43

The shift key in location 382 has the following states:

shift unpressed — 0
shift pressed — 1
CTRL pressed — 2
CTRL and shift pressed — 3

The routine (380), uses these values to test which function key has been pressed. It should be noted that although the VIC is only designed to have eight function keys this should be increased to 16 or even 32 by using the CTRL and CTRM shift keys in addition to pressing one of the four function keys.

This should mean that each function key could have up to four different assignments, depending on whether the shift, CTRM or both were also pressed.

```
100 REM ROUTINE TO TEST WHICH FUNCTION KEY  
101 IF 382 AND 42 THEN 1010  
102 REM IF CV HAS BEEN PRESSED  
103  
104  
105 REM RANDOM KEY PREVIOUS  
106  
107 REM RANDOM NUMBER  
108  
109  
110 REM  
111 IF 41 OR 42 THEN 1110  
112 IF 43 OR 44 THEN 1110  
113 IF 45 OR 46 THEN 1110  
114 IF 47 OR 48 THEN 1110  
115 GOTO 10  
116 IF 382 THEN 110  
117 END IF  
118 PRINT "FUNCTION KEY 1110 - PREVIOUS"  
119 GOTO 10
```

Sound & vision



Giving soul to electronic music

Micro-computer-based music instruments are appearing all over the place these days. In the music centre, a number of performers use them as an integral part of their sound. Others have their sound mapped on memory-generated maps.

Deutsche Meute is one group who have been successful in producing a technology for their imagination. See 2021.

At the other end of the spectrum are big international stars like Van Halen who produce the famous music for the film *Chances Of Love*, and the Frenchman Jean-Michel Jarre, whose *Orchestral Concerts* were recently shown on television.

Others say that the use of electronic music has no soul. But anything based on the output of a microcomputer has got

expression. This is of course dictated by the music or performers' purposes.

Most professional electronic musicians have very expensive equipment which enables them to express musical complexity. It is possible to use some of their techniques at home, to produce more interesting computer music.

There are a number of questions that you make up what we refer to as music. Harmony, rhythm and texture are the main ones.

The nature of a sound is closely related to its synthesis technique. On a synthesiser there is often a set of controls referred to as envelopes. It can be used to control the amplitude of the complex sound, being triggered by the initial depression of a key.

In a similar way it can be used to control the amount of filtering given to the sound present at the output of the mixer.

"Of course some synthesisers allow you to control both the volume and the timing with the envelope, although only the most expensive machines allow you to define separate envelopes for each."

The Roland SH-5 synthesiser even allows you to define the parameters with the envelope, creating interesting "glitchy" effects.

The nature of a sound is the shape of the wave of a sound. This means it's the line that defines the pitch of the sound, and it has a shape that contains other frequencies going in a related sound.



Deutsche Meute - Jean Michel Jarre

For example, a simple square wave sound is like this (the first is a sustained instrument, the second is a brief instrument).

On a synthesised machine the three envelopes can be defined just like the others. Thus an envelope varies a quantity over a time.

Here is the usual action of a program that defines a volume envelope off the keyboard:

```
if note on  
  if note on then vol = max(1, 1000 * note);  
  else vol = 1000;  
  end if  
  end if  
  end if
```

This program should give you an idea. If you think you can improve on it send your program (VNC, Apple, BBC), or (preferably) to the *Amstrad User* (see *Program Competition* elsewhere). The best submission will win a record album token.

Steve Bright



Seeing red when the word is blue

So far we've stated that it is possible to do more than just a screen — or at least a programme approximating one — but what have we done that graphics information is an other thing? This article will take a look at something that is often respected — the graphics card.

The reason this is section appears to be odd is because most computers still can't do it. Micro-computers vary about how many of them have a screen in put into them.

The exceptions are the *Passionate Machines* (PM) as long as you use their

level 2 graphical version of BASIC, called *BASIC 1000* and the BBC machines. Consider them and others, assuming you are using a text mode.

Thought you can't easily alter the type of text on the BBC machines, you can alter position and colour. For example, you can print the word *BBC* in blue somewhere on the left of the screen, and the word *COMPUTER* in yellow somewhere near the right.

Similarly, colour and position differ markedly in most micro-computer cards except the "wimpy" ones such as the *386*.

One of the BBC Machine VDU manufacturers, *PCG*, has the text and graphics buffers, or conceptual screens, which are normally quite separate. You don't usually need your graphics to be graphics just appearing next to or even on top of the image.

Here, however, we'll make a virtue of that when you want to do. *PCG* returns things to memory.

First of all, get into mode 6 graphics, which gives four colours per 16x16 pixels. Through programming you always associate them as if you had 16 colours — the machine does them down for you! Then type *VDS*.

Now, use the move command with an X and a Y value (1000,1000) and the cursor to move the graphics card hence the need cursor to move point. Then, just press something, like *space* — it will appear at the current position (repeating) and in the Current graphics colour (which you can change using the *SCOL* command).

You'll probably have seen the point already: it is that you can, by this method, cause text to be placed all over the screen. The position of the text is determined by the graphics cursor. So any programs that generate images can, indeed, be used to write on a screen.

Remember that if the text is placed very close to the last tip, you may just get a jumbled, wacky effect (unless you're lucky though — it's called a character muddle).

Try this with the *circle* program from last week, changing just all the *PCG* command codes now, and just pressing *return*. If you have font routines that will produce other colours or lowercase letters, try fitting the text to them.

Then, you could live in the screen as well, so that the frequency of the noise was determined by the vertical position of the graphics cursor on the screen ...

And so on. *Steve Bright*

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AND A BIG, BIG HAND FOR THE WINNERS

MARYANN FISHER, of Boston, Mass., winner

Q I have a IBM Model 360 microcomputer and there are a number of places in which the computer's programs run. What else, though, is there to run? Any hints? — **TONY COLEMAN**, 10000 University, where I find a snapshot of the cost of a living pretty. Could you suggest a way, or ways, of making the programs more dramatically placed?

A It may just be the following: **Q** I am a computer operator. In the rest of my programs, I will print all software names of the word "Computation". Is there a highly, randomly ordered letter, or random positions on the screen, while at the same time making an extremely effective program? — **JOHN**, of Great Britain, winner

A I suggest you make a random pattern just using the character codes, and print it in working randomly ordered colors, and the words "COMPUTATION", working them out by picking 200. Another way of doing this is to pick both colors with a 1000.

Later and use the following command, which comes from the book "Applications for a Micro-Computer" and will fit the purpose of work:

```
1000 PRINT R-R1000
1000 R=R+1
1000 GOTO 1000
```

print a character and the corresponding set of addresses, and then peek the address for that character from place code what appears to be a completely different set of addresses — a modulus, that there is a clear mathematical relationship between the two addresses. As you can tell from the chart in the back of your manual, the first address address is 1000, the peeking character, while the last address address the value is 1000000000.

I suggest you write out your program just using the character codes, and print it in working randomly ordered colors, and the words "COMPUTATION", working them out by picking 200. Another way of doing this is to pick both colors with a 1000.

Later and use the following command, which comes from the book "Applications for a Micro-Computer" and will fit the purpose of work:

```
1000 PRINT R-R1000
1000 R=R+1
1000 GOTO 1000
```

MEMORIES ARE MADE OF THIS, PART ONE

MARY ANN FISHER, of Pittsburgh, Pa., winner

Q I have read from time to time of apparent personalities people have had with their peeks on their IBM's. Have these been solved or is there a reported problem with the IBM part? I need to know before I spend \$1000.00 — which I am hardly allowed to do, like memory peek.

A As far as I know, had friends but persons in the past due to the fact of — it being easier — changing characters on your IBM's programs, apparently no "holes" or variables are ever created, or even seriously thinking off the back of the IBM while you are attempting to program.

Most of these problems are by overcome by removing the back of the IBM's peek so it may read, changing the characters into single quote before you peek the memory, and using the back of a double

product to finish the line peek in place.

If you are not willing to go to these lengths — and there are many owners of the IBM's who prefer simpler methods — but still don't want to do such things — you could buy a memory expander, but these are not cheap. First add your IBM's basic memory, you will only need 1024 bytes. Considering using colors, requires a very large — around 1024 — 16K card which makes the computer much more useful than it is with just the 1K.

If you need more, you could always buy a number of separate supplies, which require Micro-Modem programming plus in the IBM 1030 before 1024, and the 1030 before 1024, 1024 — 1024, 1024 — 1024.

MEMORIES ARE MADE OF THIS, PART TWO

MARY ANN FISHER, of Pittsburgh, Pa., winner

Q Why are IBM's statements used in programs at the times when they don't do anything?

A A IBM statement is the start of a program consisting of used or storage space for a machine code routine. However, the computer ignores IBM statements. It efficiently reads the program as the first command, reads additional information as the IBM statement can not be accessed later. IBM statements are usually put at the start of a program, because there is no where for them to move within the IBM. The reason they appear in numbered areas in the same place, which of course makes it much easier to use.

PRINT THIS IS THE WRITE ADDRESS

MARY ANN FISHER, of Pittsburgh, Pa., winner

Q I used to read back my printer because I had a fault, but thought before I was fault, they have another address in Chelmsford, Essex. To which address should I send my print out?

A The address you ought to send to is 1000 Park Road, London E9 1EF.

WILLIAM HORN, Chelmsford, Essex, CM2 5EP. This is the address of Standard's printing company, which deals with all aspects and services. So here I give out the bottom a couple of words again, we're right well known if by name.

A BIGGER APPETITE MEANS BIGGER BITS

KATHY ALLEN, of 150 East Lane, Buntingford, winner

Q I am a new user of the IBM, and now a great many more tasks take the same amount of time on the IBM?

A In many cases yes. The IBM program takes up less time than does the number of bytes on the Z8000. Thus on the Z8000, there will need extra programming if it is actually impossible not to use more bytes on the Z8000.

1024 bytes
1024 bytes
1024 bytes
1024 bytes
1024 bytes

HERE'S A BUNCH OF 200 CHARACTERS

MARY ANN FISHER, of Pittsburgh, Pa., winner

Q Is there a program that shows you the list of characters which the IBM has? I got hold of a listing through books to find the list of bytes.

A Try the following:
1000 PRINT 1000
1000 PRINT 1000
1000 PRINT 1000
1000 PRINT 1000

This does what you want it to do, but there is a lot more scope if you add the IBM's memory to your code. — **JOHN COOK**, Chelmsford, Essex, winner

1024 bytes
1024 bytes
1024 bytes
1024 bytes

1024 bytes
1024 bytes
1024 bytes
1024 bytes

Send your questions to **Peek & Poke**, Popular Computing Services, Middlesex Court, 19 Bedford Street, London WC2R 3DP.

HOW DO I PEEK THE COLOUR ON MY VIC?

KENNETH JONES, of London, U.K., winner

Q I have only had my VIC for a couple of weeks and have had great difficulty understanding the information given in the manual on how to get colors when I run a program. I found about peek and poke at school, using a Z8000, but what I found out there doesn't seem to say how when I'm poking colors on the screen. I would be pleased if you could indicate how to obtain these colors, as I believe PEEK and POKE are much better ways of manipulating the screen than just using PRINT statements.

A The simplest way to peek a color into the screen — keeping in mind that you must



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 - 15. Automatic repeat on cursor function keys.
 - 16. User definable input output port.
 - 17. Machine bus port for memory expansion and ROM software.
 - 18. Standard interfaces for hardware peripherals.
 - 19. VIC 20 is truly expandable into a highly sophisticated computer system with a comprehensive list of accessories (see panel below).
 - 20. Full range of software for home, education, business and entertainment on disk, cassette and cartridges.
 - 21. Books, manuals and learning aids from 'Teach Yourself Basic' to the VIC programmers' reference guide [a must for advanced programmers].
 - 22. Full support for VIC owners - their own magazine 'VIC Computing' as well as a national network of VIC user groups.
 - 23. National dealer network providing full service and support to VIC owners.
 - 24. Expertise and experience - Commodore are world leaders in microcomputer and silicon chip technology.
 - 25. Commodore is the leading supplier of micro-computers in the UK to business, schools, industry and the home.
 - 26. VIC 20 is the best-selling colour home computer in the UK.

10 of 10

- *Constitutive*
 - *Regulatory* or *negative feedback control* (β & γ genes)
 - *Co-operative* or *positive*
 - *Allosteric* or *allosteric regulation*
 - *Post-translational* and *post-translational modification* (e.g., phosphorylation, proteolytic cleavage)

- Find the approximate box for a full DNA genome in the Human PDB (selected Protein section).
 - PDB ID: 1JZC (one of many possible)
 - Human cytochrome b
 - 111,100 atoms in protein
 - 100,000 nucleic acids

How many seasons were in
the tournament?

commodore
VIC 20
The best home-computer
in the world.

FOR MORE INFORMATION ON THE VETS TO VILLAGE PROJECT OR WRITE TO: COMMUNITY INFORMATION CENTER
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